

CLAIMS

1. A door control assembly for a door closing an opening into a refrigerated compartment comprising:
 - (a) a mounting plate attached to the door;
 - (b) a flange attached to a wall of the refrigerated compartment, the flange having a platform extending away from the wall;
 - (c) a first ball stud and a first post extending from the platform;
 - (d) a reciprocating arm coupled to the mounting plate;
 - (e) a second ball stud and a second post extending from the reciprocating arm and oriented generally perpendicular to the reciprocating arm;
 - (f) a control mechanism pivotally engaged with the first ball stud at a first end and with the second ball stud at a second end; and
 - (g) a cable coupled to the first post at a first end and to the second post at a second end.
2. The door control assembly of claim 1 wherein the mounting plate further comprises upper and lower brackets each having receiving channels therein and a plate extending away from the door, the plate having a flat portion adjacent to the wall and a curved section partially surrounding the first ball stud and first post.
3. The door control assembly of claim 2 further comprising a cover having coupling members that engage the receiving channels of the mounting plate and a curved canopy at a first end that mates with the curved section of the plate to form a casing surrounding the first ball stud and the first post.
4. The door control assembly of claim 3 further comprising a cap coupled to an upper edge of the casing.
5. The door control assembly of claim 3 wherein the cover further comprises a locking tab at a second end that couples to a handle extension on the door.

6. The door control assembly of claim 5 wherein the mounting plate further comprises a mating member that couples with the handle extension.
7. The door control assembly of claim 2 wherein the reciprocating arm is coupled to the lower bracket by a pinned joint at a lower end of the reciprocating arm, and wherein the reciprocating arm pivots about the pinned joint.
8. The door control assembly of claim 1 wherein the door control assembly exerts an opening force when the door is open at an angle with respect to the wall of between about 90 degrees and about 110 degrees, and wherein the door control assembly exerts a closing force when the door open angle is less than about 45 degrees.
9. The door control assembly of claim 1 wherein the door control assembly is configured to park the door in an open position.
10. The door control assembly of claim 9 wherein the open position is at a door open angle of about 120 degrees or greater.
11. The door control assembly of claim 1 wherein the control mechanism comprises a fluidic control mechanism.
12. The door control assembly of claim 11 wherein the fluidic control mechanism comprises an assembly selected from the group consisting of pneumatic assemblies and hydraulic assemblies.
13. The door control assembly of claim 12 wherein the fluidic control mechanism comprises a cylinder and gas piston.
14. In combination, a door closing an opening in a wall of a refrigerated compartment, a hinge set, and a door control assembly, the door control assembly comprising:
 - (a) a mounting plate attached to the door;
 - (b) a flange attached to a door frame of the refrigerated compartment;

(c) a door control mechanism having a first end attached to the flange and a second end attached to the mounting plate; and

(d) a cover attached to the mounting plate and overlying the first end of the door control mechanism, the cover having a canopy cantilevered over the flange and enclosing the first end of the door control mechanism against the wall.

15. The combination of claim 14 wherein the mounting plate further comprises a curved section positioned between the wall and the first end of the door control mechanism, the curved section cooperating with the canopy to enclose the first end of the door control mechanism.

16. The combination of claim 15 further comprising a cap coupled to an upper edge of the curved section and the canopy and positioned above the first end of the door control mechanism.

17. The combination of claim 14 wherein the door control mechanism comprises:

- (a) a reciprocating arm mounted to the mounting plate by a pinned joint;
- (b) a fluidic control mechanism coupled to the reciprocating arm; and
- (b) a cable coupled to the reciprocating arm.

18. The combination of claim 17 wherein the door control assembly further comprises:

- (a) a first ball stud and a first post extending from the flange; and
- (b) a second ball stud and a second post extending substantially perpendicularly from the arm,

wherein the fluidic control mechanism is coupled to the first ball stud at a first end by a first socket and to the second ball stud at a second end by a second socket, and

wherein the cable is coupled to the first post at a first end and to the second post at a second end.

19. The combination of claim 14 wherein the door control assembly is configured to apply an opening and a closing force to the door, wherein the opening force is exerted when the door is open at an angle with respect to the wall of between about 90 degrees and about 120 degrees, and wherein the closing force is exerted when the door open angle is less than about 45 degrees.

20. The combination of claim 19 wherein the door control assembly is configured to park the door in an open position.

21. The combination of claim 20 wherein the open position is at an open angle of about 120 degrees or greater with respect to the wall.

22. The combination of claim 19 further comprising:

- (a) an upper door hinge having a hinge pin; and
- (b) a lower door hinge having a hinge pin,

wherein the door control assembly is positioned between the upper and lower door hinges,
wherein the hinge pin of the lower hinge is displaced away from the wall a greater distance than the pin of the upper hinge, and
wherein the upper and lower hinges contribute to the opening and a closing force applied to the door.

23. The combination of claim 14 further comprising:

- (a) a door handle; and
- (b) a handle extension coupled to the door handle at a first end and extending across the door and coupled to the cover at a second end.

24. A concealed middle position door control assembly comprising:

- (a) a door control mechanism for applying opening and closing force to a door;
- (b) a mounting plate positioned behind the control mechanism, the mounting plate having a curved section cantilevered away from the mounting plate; and

(c) a cover overlying the control mechanism,
wherein the cover has a canopy at a first end that cooperates with the curved section to enclose the control mechanism, and
wherein the cover is coupled to the mounting plate at a second end.

25. The door control assembly of claim 24 further comprising a handle extension coupled to the second end of the cover.

26. The door control assembly of claim 25 wherein a locking tab at the second end of the cover inserts into a channel in the handle extension.

27. The door control assembly of claim 24 further comprising a flange wherein a lower portion of the flange includes a platform that supports attachments for one end of the door control mechanism.

28. The door control assembly of claim 27 wherein the door control mechanism comprises a fluidic control mechanism, and wherein the door control assembly further comprises:

(a) a first ball stud and a first post protruding from the platform in a first direction;

(b) an arm pivotally mounted to the mounting plate;

(c) a second ball stud and a second post protruding from the arm in a second direction,

wherein the second direction is generally perpendicular to the first direction; and

(d) a cable,

wherein the fluidic control mechanism is coupled to the first ball stud at a first end and to the second ball stud at a second end, and

wherein the cable is coupled to the first post at a first end and to the second post at a second end.

29. The door control assembly of claim 28 wherein the fluidic control mechanism is selected from the group consisting of a pneumatic assembly and a hydraulic assembly.
30. The door control assembly of claim 29 wherein the fluidic control mechanism comprises a cylinder and gas piston.
31. The door control assembly of claim 28 further comprising a cap coupled to an upper edge of the curved section and to an upper edge of the canopy and positioned above the first ball stud and the first post, and wherein the cap includes pins that inserts through openings in the mounting plate and the cover to secure the canopy to the curved section.
32. A refrigerated compartment comprising:
- (a) a wall;
 - (b) door positioned within a door frame and closing an opening in the wall;
 - (c) an upper door hinge having a hinge pin displaced a first distance away from the door frame;
 - (d) a lower door hinge having a hinge pin displaced a second distance away from the door frame, wherein the second distance is greater than the first distance;
 - (e) a door control mechanism having a first end attached to the door frame between the upper and lower hinges and a second end attached to a midsection of the door and, wherein the door control mechanism is configured to exert an opening force when the door is opened by a user and to exert a closing force when the door is closed by a user; and
 - (f) a cover that conceals the door control mechanism.
33. The combination of claim 32 wherein the opening force is exerted when an angle that the door is open with respect to the wall is between about 90 degree and

about 120 degrees, and wherein the closing force is exerted when the door open angle is less than about 45 degrees.

34. A door control assembly configured to exert an opening and a closing force on a door positioned within a door frame, the door control assembly comprising:

- (a) a reciprocating arm coupled to the door;
- (b) a flange attached to the door frame;
- (c) a fluidic control mechanism coupled to the flange at a first end and to the reciprocating arm at a second end; and
- (d) a cable coupled to the flange at a first end and to the reciprocating arm at a second end.

35. The door control assembly of claim 34 further comprising:

- (a) a first ball stud and a first post extending substantially vertically from a platform at a lower end of the flange; and
- (b) a second ball stud and a second post extending substantially perpendicularly from the arm,

wherein the fluidic control mechanism is coupled to the first ball stud at a first end by a first socket and to the second ball stud at a second end by a second socket, and

wherein the cable is coupled to the first post at a first end and to the second post at a second end.

36. The door control assembly of claim 35 wherein the fluidic control mechanism comprises an assembly selected from the group consisting of pneumatic assemblies and hydraulic assemblies.

37. The door control assembly of claim 36 wherein the fluidic control mechanism comprises a cylinder and gas piston.

38. The door control assembly of claim 35 wherein a pivot point of the door passes through the platform, and wherein the first ball stud is mounted to the

platform opposite the pivot point from the door jamb, and wherein the first post is mounted to the platform between the door frame and the pivot point.

39. The door control assembly of claim 38 wherein the fluidic control mechanism comprises a cylinder housing a piston, and wherein a piston rod is attached to the piston and protrudes from the cylinder.

40. The door control assembly of claim 39 wherein a longitudinal axis of the cable and the piston rod are substantially aligned with each other when the door is open at an angle of about 45 degrees with respect to the wall.

41. The door control assembly of claim 40 wherein a pushing force exerted on the door by the fluidic control mechanism is substantially the same as a pulling force exerted on the door by the cable.

42. The door control assembly of claim 41 wherein the reciprocating arm is in a substantially vertical position.

43. The door control assembly of claim 38 wherein when a door open angle is less than about 45 degrees, a plane passing vertically through cable resides at a location between the pivot point and the door frame, and the fluidic control mechanism and the cable exert a net closing force on the door.

44. The door control assembly of claim 38 wherein when the door is open at an angle with respect to the wall that exceeds about 45 degrees, a plane passing vertically through the cable resides at a location opposite the pivot point from the door frame and the fluidic control mechanism and the cable exerts a net opening force on the door.

45. The door control assembly of claim 44 wherein the fluidic control mechanism and the cable exert a net opening force on the door when the door open angle is between about 90 degrees and about 120 degrees.

46. The door control assembly of claim 45 wherein when the door open angle exceeds about 150 degrees, the cable becomes slack and does not exert force on either the door or the door frame.